No. 719,567. PATENTED FEB. 3, 1903.

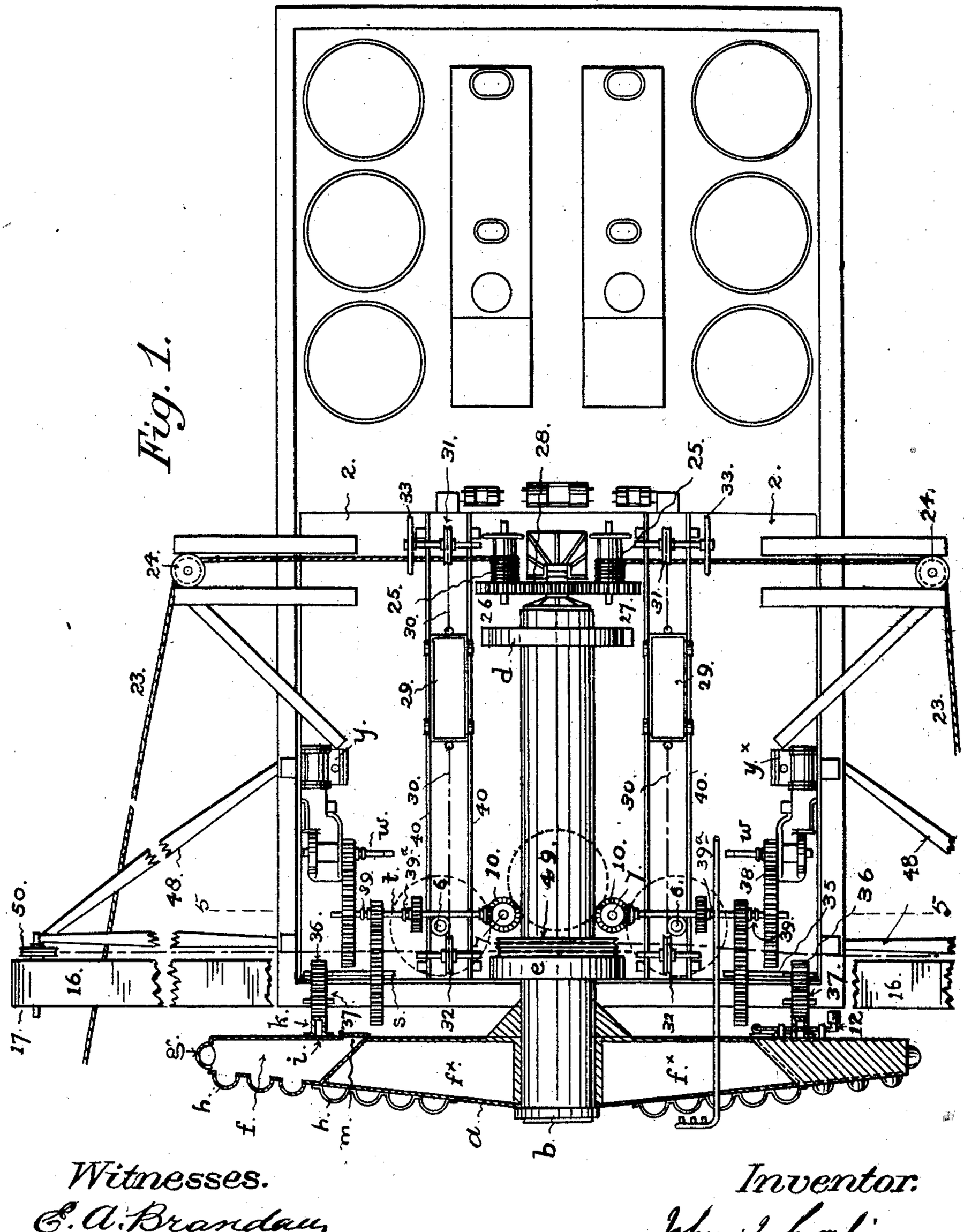
J. J. CONLIN.

DREDGING AND EXCAVATING MACHINE.

APPLICATION FILED SEPT. 5, 1902.

NO MODEL. 4 SHEETS—SHEET 1.

Fig. 1.



Witnesses.
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E. W. Osborn

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Fig. 3.

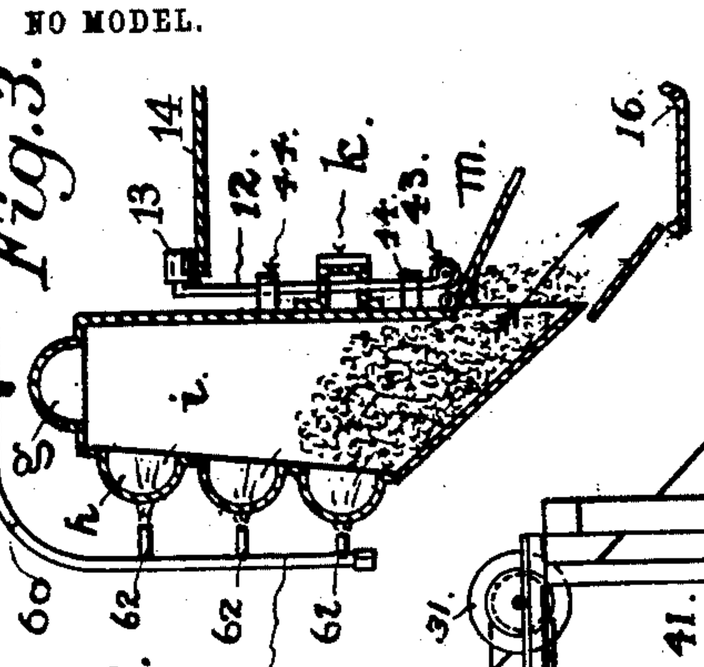

Fig. 2.

Fig. 4.

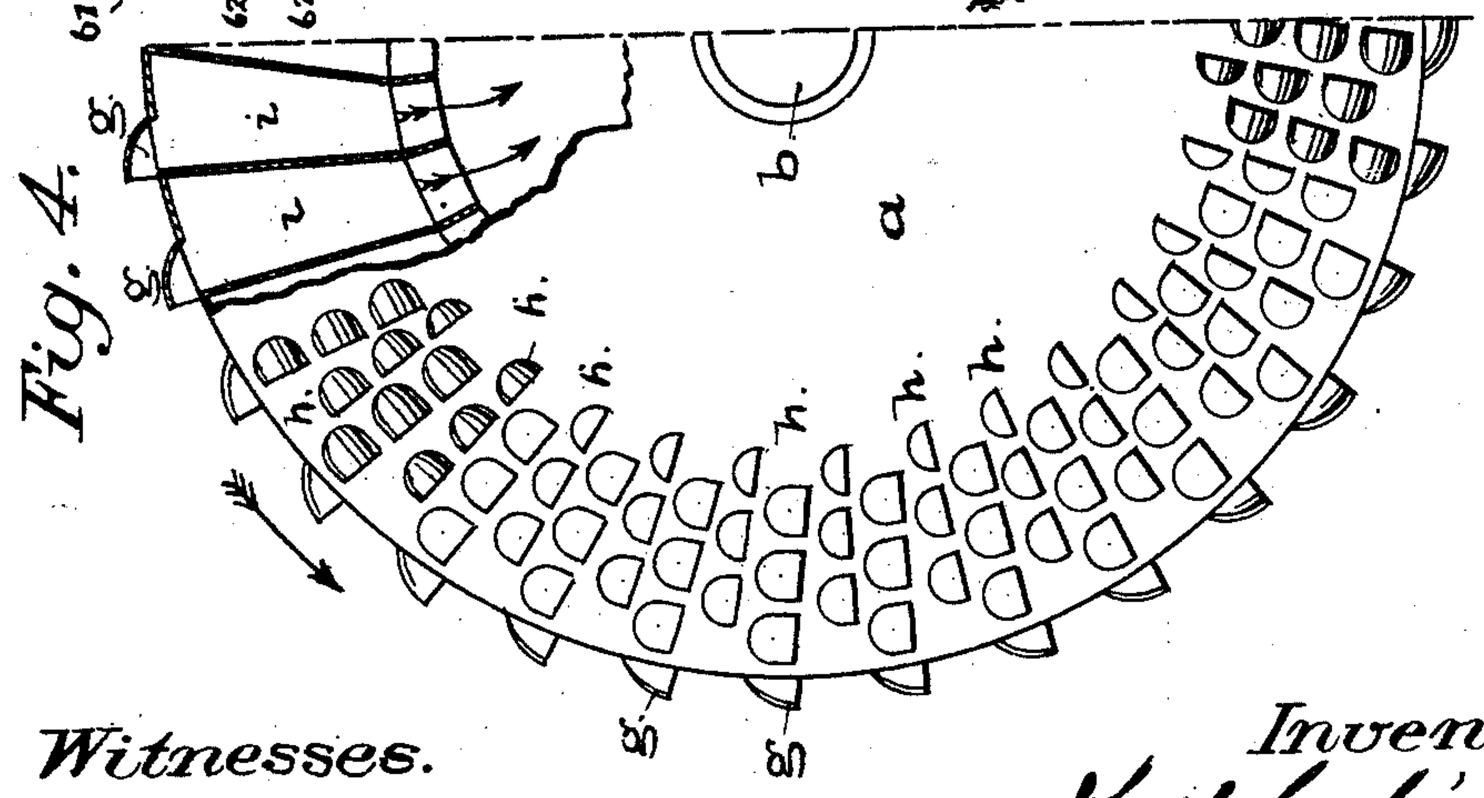

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Fig. 5.

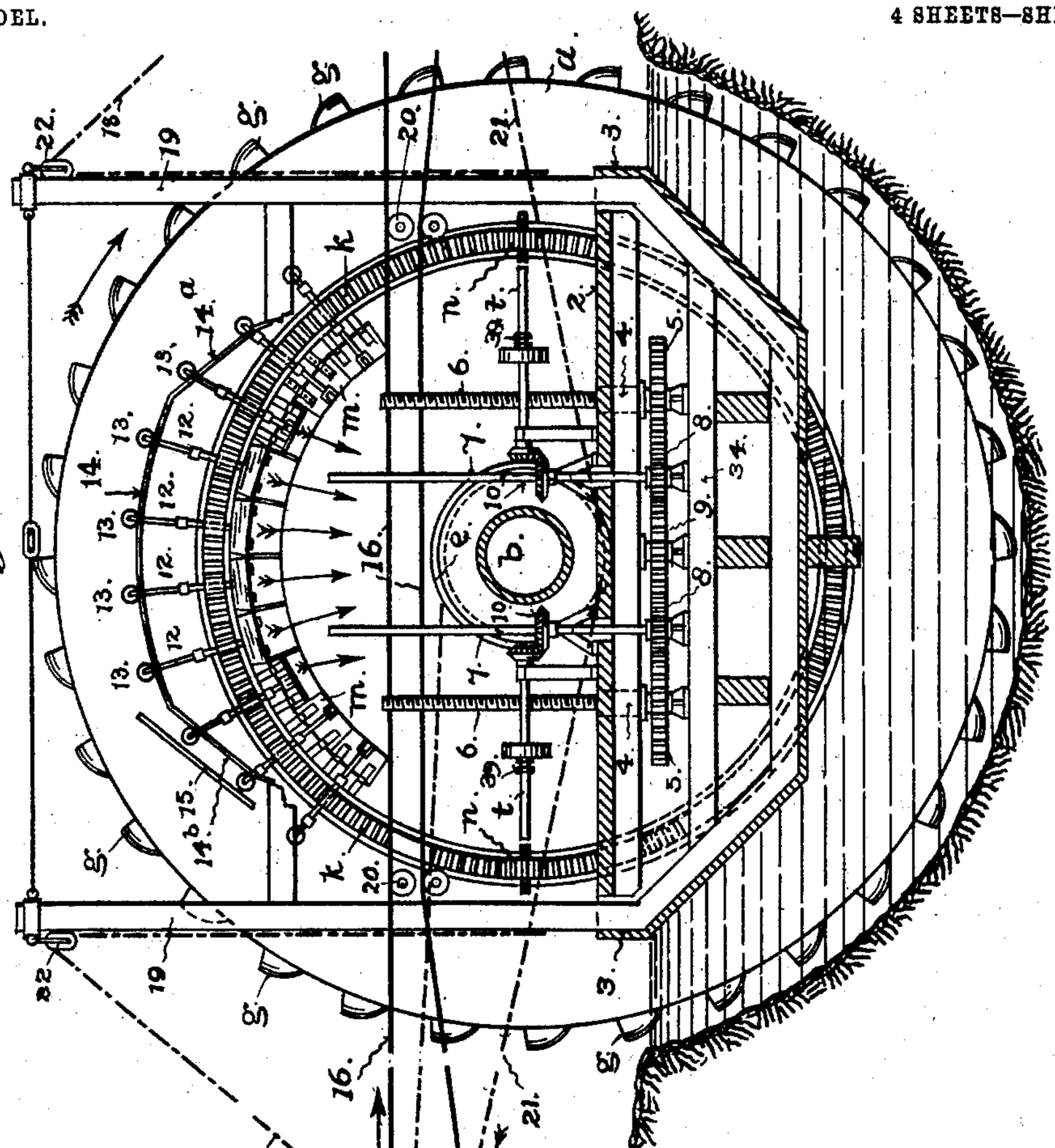
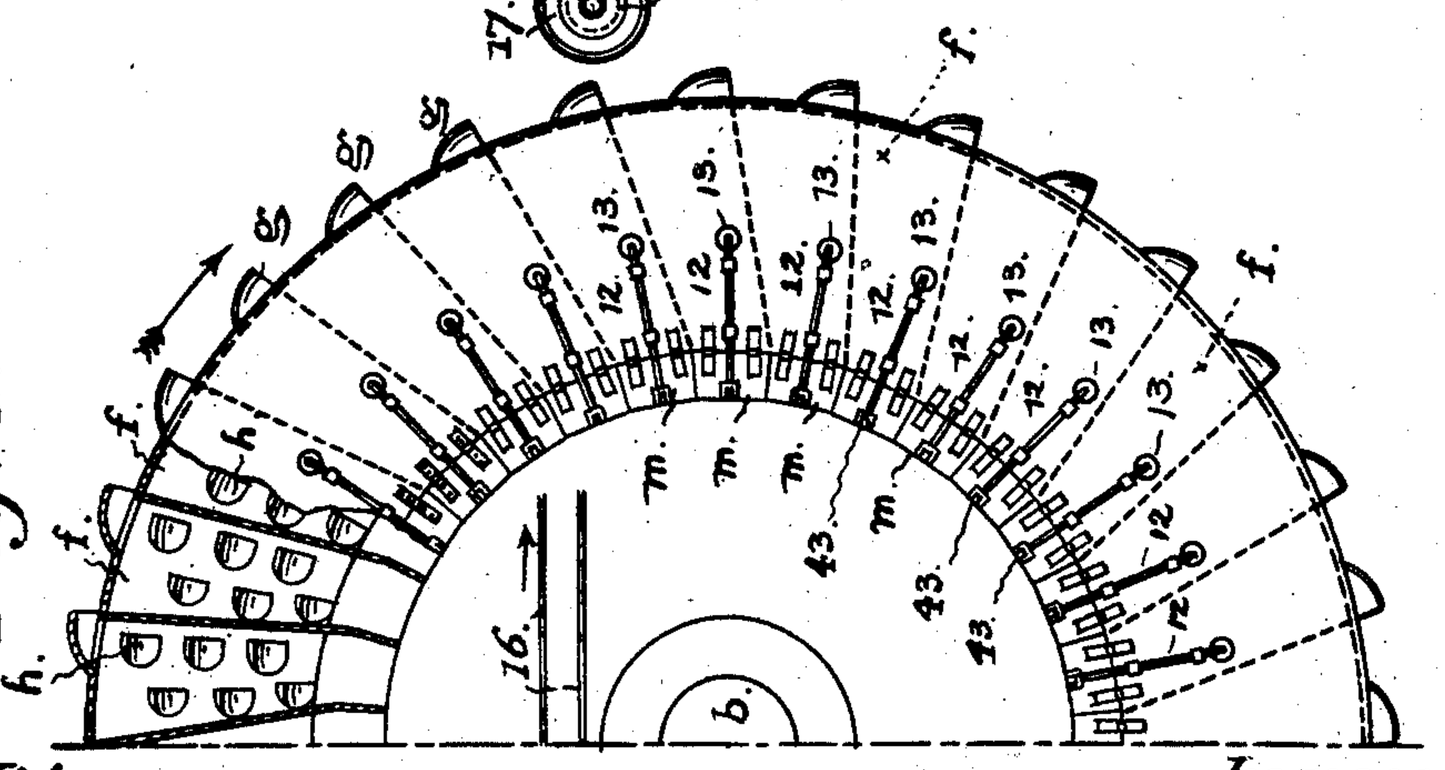


Fig. 6.



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NO MODEL. 4 SHEETS—SHEET 4.

Fig. 8.

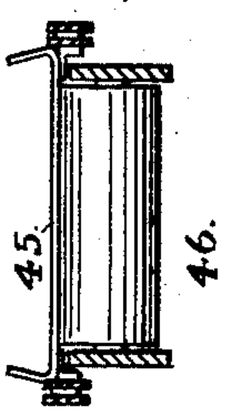
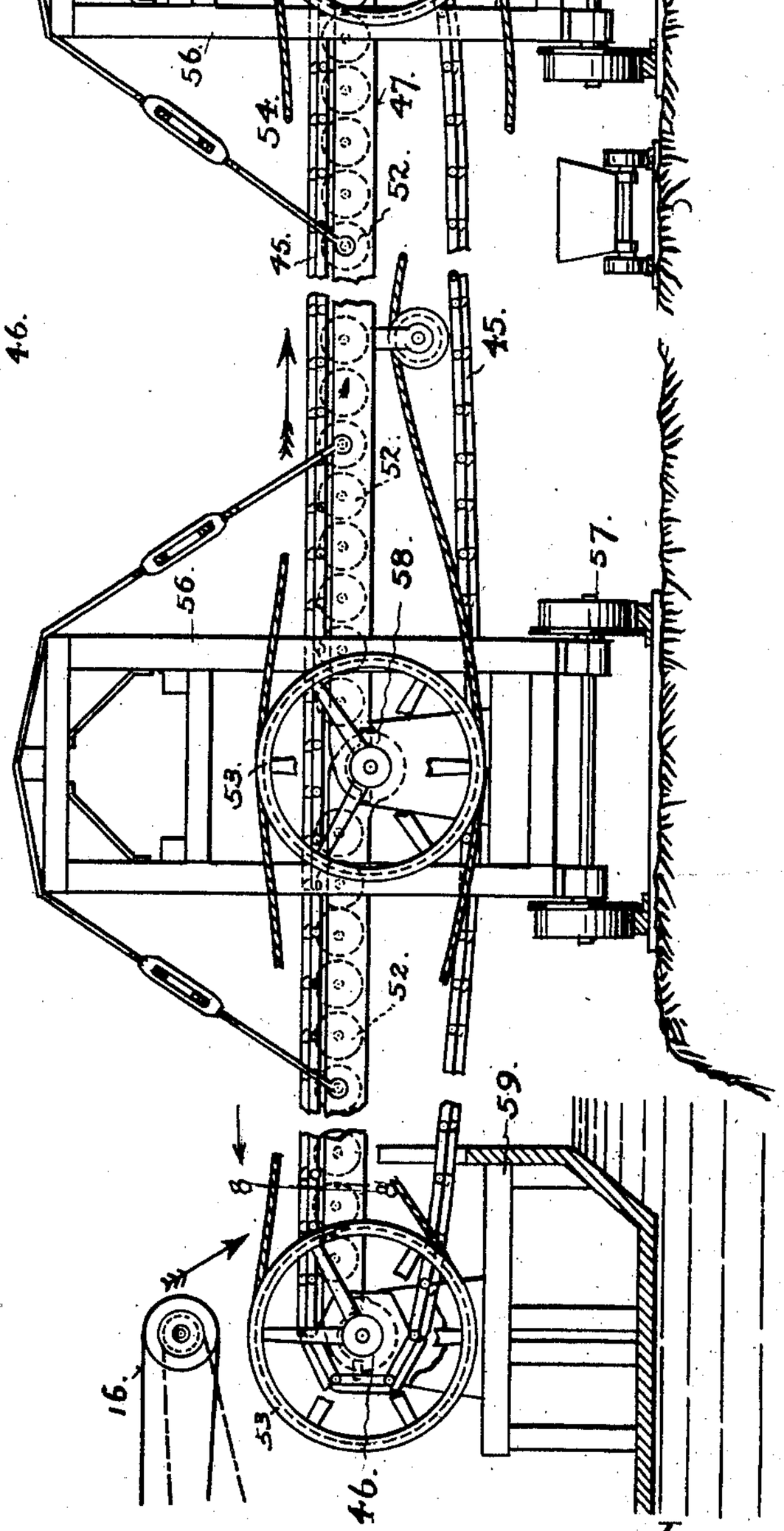


Fig. 7.



Witnesses.
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UNITED STATES PATENT OFFICE.

JOHN J. CONLIN, OF SAN FRANCISCO, CALIFORNIA.

DREDGING AND EXCAVATING MACHINE.

SPECIFICATION forming part of Letters Patent No. 719,567, dated February 3, 1903.

Application filed September 5, 1902. Serial No. 122,158. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. CONLIN, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented a new and useful Improvement in Dredging and Excavating Machines, of which the following is a specification.

This invention relates to certain improvements made in that class or description of apparatus, sometimes termed a "wheel-dredger," for cutting and raising mud, sand, and similar material in dredging and excavating operations, the dredging implement consisting of a wheel having compartments or receptacles arranged in a circle around its axis, with inlet-apertures provided with scoop-shaped cutters in one side of the compartment and an outlet for the material in the opposite side controlled by a door. As the wheel is revolved on its axis in an upright position the compartments take in the material at the lower side of the wheel through the scoops and discharge it through the door-controlled outlets when each compartment arrives at its point of highest elevation over the axis in the revolutions of the wheel.

The invention consists in certain novel parts and their combination in an apparatus for dredging and for handling the dredged material in a rapid and economical manner, as hereinafter fully described, and pointed out in the claims at the end of this specification.

In proceeding to explain the nature and the construction of these improvements it is necessary to illustrate other well-known parts and mechanism that are required to produce an operative machine; but the same will be described in a general way, except where a clear understanding of the implements may seem to require a detailed description.

In the accompanying drawings, herein referred to by figures and letters, Figure 1 is a top view or plan of the apparatus mounted on a scow, showing the dredging-wheel in horizontal section and portion of the endless-belt conveyer broken away. Fig. 2 is a side elevation of the dredging-wheel and the mechanism mounted on the forward end of the scow for raising and lowering the wheel and for driving it. Fig. 3 is a fragmentary section of the rim of the wheel, showing in detail one of the compartments and the device for opening and closing the door, also the water-pipe for cleaning out the inlets in the periphery and the front face of the wheel. Fig. 4 is a one-half front view of the dredging-wheel, showing a portion of the shell broken away to expose the compartments inside. Fig. 5 is a vertical transverse section taken through the line 5 5, Fig. 1. Fig. 6 is a one-half rear view of the wheel, showing the dredging-outlets and the doors controlling them. Fig. 7 is a side elevation of an auxiliary endless conveyer for handling the material as it leaves the end of the conveyer on the dredger-scow and depositing it on the land at a distance from the place of dredging. Fig. 8 is a transverse section at 8 8, Fig. 7.

The dredging-wheel *a*, fixed on one end of a heavy shaft or axle *b*, is mounted on a movable platform 2, which is raised or lowered to regulate the depth of the cut below the surface of the water. Bearings *d e* on this platform near the front and rear ends support the axle horizontally. The compartments *f*, arranged concentrically around the axis, extend from the periphery toward the center, and on the end nearest the center they are provided with bottoms sloping from the front or outer face to the inner face of the wheel. Inlet-apertures are usually provided in the rim as well as in the front face, as shown at *g* and *h*. The outlet *i* of each compartment is located in the rear face of the wheel at the bottom of the incline and is controlled by a door *m*, that is opened automatically as often as the revolutions of the wheel bring the compartment to the top of the wheel. In these general features the wheel is similar to dredging-wheels of the same character and mode of operation; but in addition to these receptacles around the periphery the wheel is constructed with a central chamber or compartment $f^{\times}$, with water-tight walls for the purpose of giving greater buoyancy to the wheel when working in the water. In connection with a wheel of this description I will now proceed to describe my novel means for raising and lowering the wheel to regulate the depth of its cut and for driving it.

Referring more particularly to Fig. 5 of the drawings, 4 4 indicate threaded nuts fixed in

the movable platform 2 near the forward end on opposite sides of the axle. 6 6 are long screw-threaded rods working through the nuts, and 5 is a spur-gear fast on the lower end of each screw-rod, the lower end of the rod having a bearing in a box 34, fixed on stationary timbers under the platform. 7 7 are upright shafts each geared into a separate counter-shaft *t* by bevel-gears 10 and carrying on its lower portion under the movable platform a pinion 8, that connects the shaft with a gear 5, keyed on the screw-rod. An idle gear 9, placed between the two pinions, holds them to the gears 5 and insures uniform motion of the two screws, it being noticed that each counter-shaft *t* is driven by a separate engine, one, *y*, situated on the port and the other, $y^{\times}$, on the starboard side of the scow. Power to rotate the wheel is also supplied from the same engines by gearing each counter-shaft into a short intermediate shaft 35, carrying a spur-gear 36, which is connected with a gear-ring *k*, fixed on the rear face of the wheel by an idler 37. The principal gear, driven by the engine-shaft *w*, is thrown in or out of action by a clutch 39 in the counter-shaft *t*, and in addition to this a second clutch 40 is provided in the counter-shaft for throwing the power on or off the upright shaft 7. Arranged and connected in this manner the power to raise and lower the wheel and also to drive it is taken from the two engines, and either engine or both engines can be thrown on the wheel, according to the character or condition of the material in which the apparatus is at work. Where the wheel is cutting in soft bottoms, one engine may furnish ample power to do the work, and at other times or as the conditions vary and harder stratums or bodies are encountered both engines may be brought into service.

In connection with the movable platform 2 and the mechanism for raising and lowering it I employ a novel means for counterbalancing the platform and the wheel mounted on it, so as to maintain the platform horizontal and prevent the fixed nuts from binding on the screw-rods 6. This means and its mode of operation will be readily understood from Figs. 1 and 2, in which two weighted wheeled trucks 29 29 on elevated tracks 40 are connected each with a separate shifting means consisting of an endless wire cable 30, running over sheaves 31 32 at the front and rear ends of the framework 41, that supports the trucks upon and is a part of the movable platform. A hand-wheel 33 on the rear sheave of each cable furnishes means for shifting the truck forward or backward on the supporting-frame. These trucks are loaded with a quantity of scrap-iron or other heavy material, and by their position with relation to the dredging-wheel at the front they serve to counterbalance the excess of weight on the front end of the movable platform due to the wheel and its load, thereby keeping the platform practically or sufficiently horizontal during the operation of raising or lowering it.

The door *m*, that controls the discharge-opening *i* of each receptacle *f*, is hinged at the end nearest the periphery of the wheel and is free to swing on such hinge, except as it is held closed by a draw-rod 12. This rod is fitted to slide loosely in guides 4 4 on the wheel, and on the end nearest the rim of the wheel it is provided with a roller 13, the rod being bent at right angles at that end to bring the roller in working position in a plane with a stationary curved rail 14 on the framework carried by the movable platform. On the opposite end of the rod a loosely-journaled roller bears against the door *m* when the rod is in its lowest position and prevents the door from swinging open. This rail 14 has inclines 14^{a} at the ends; but for the remaining portion it is concentric with the axis of the wheel, and consequently on striking and riding on the incline 14^{a} the rod 12 is drawn up, releasing the door and allowing it to swing open under the weight of the material, or in running on the incline 14^{b} at the opposite end the rod is pressed downward, bringing the roller 43 against the door and holding it closed. In passing from the curved portion 14 onto the incline 14^{b} the draw-rods engage a top rail 15, and in passing between these two inclines 14^{b} 15 the rods are pressed down against the doors. From that point where they leave the incline the rods hold the doors closed against the pressure of the material behind them until by the revolution of the wheel each draw-rod is brought again in contact with the incline 14^{a} on the opposite side.

I am aware that compartments in a dredging-wheel of this character have heretofore been provided with sliding doors or gates working in grooves and opened and closed by means of similar stationary inclines by the revolutions of the wheel; but such arrangement of sliding gates is objectionable, for the reason that the pressure of the material against the back of the gate is liable to make it bind in the grooves, and thus increase the strain on the opening and closing mechanism. In my improved construction the door swings open readily under the weight of the material as soon as the rod 12 is drawn up and closes by its own weight as soon as the material has been discharged from the compartment. The draw-rod 12 acting chiefly to lock and release the door is not attached to it, and when in motion it calls for but a comparatively small amount of power to work it, thus relieving the parts of excessive strain and allowing the weight to be reduced.

In connection with a compartment-wheel of this character having cutting-scoops on its face I provide a novel means of preventing the material from choking and clogging the inlets, consisting of a water-pipe 60, connected with a suitable source of water under pressure on the scow and from that point carried upward behind and over the top of the rim,

where it terminates in a bent nozzle 61, having a nipple 62 in line with the mouth or opening of each scoop. This nozzle is arranged to direct a jet into the scoop with sufficient force to dislodge any stuff that may choke the opening, and thus keep the inlets open.

The material discharged from the compartments as they reach their highest point of elevation is deposited upon an endless traveling conveyer 16, composed of trough-like plates or sections attached together at the ends by loosely-jointed links or connections that allow the endless belt of plates to pass around rollers 17 at the ends of the supporting-frame. In its general construction and operation the endless conveyer for receiving and handling the dredged material from the dredging-wheel does not differ materially from the endless traveling conveyers already in use for handling and carrying material from a receiving-point at one end to a place of deposit situated at a greater or less distance. The endless conveyer, combined with the present dredging-wheel, is arranged transversely over the axle of the wheel, and its frame 47 is supported by outriggers 48, projecting from the sides of the scow. The power to move the apron 16 is taken from the large shaft or axle of the wheel by means of wire-cable belts 21, carried from a sheave 49 on the axle to smaller sheaves 50 on the axles of the rollers 17 at the outer ends of the conveyer-frame. The large sheave 49 has several V-shaped grooves in which the cables are laid in several turns to obtain the necessary purchase and grip on the cable. The conveyer thus derives its motion directly from the rotating movement of the wheel, and its rate of travel is regulated by that of the wheel. It is thus always proportionally fast or slow in its rate of travel.

Where the dredged material requires to be deposited at a greater distance from the locality of dredging than the conveyer 16 will operate, I provide an auxiliary conveyer of the same general construction, excepting that it is mounted and carried as a separate structure composed of a framework on portable trucks capable of being shifted from place to place, and its position is adjusted with relation to the conveyer 16 on the scow so as to take the material as it leaves the end of the conveyer and carry it to a farther point of discharge. A construction of portable conveyer applicable for this purpose is illustrated in Figs. 7 and 8 of the drawings. The endless belt is composed of the trough-like sections 45, with a flat bottom and standing edges loosely connected together by links, as already described, and the upper or working portion of the belt thus formed is carried by rollers 52, loosely journaled in the frame 47, from one end to the other. Fast on the axles of the end rollers 46 are sheaves 50 of large diameter, and from these sheaves endless driving-cables 54 are carried to the main sheaves on the axle of the dredging-wheel in cases where the power can be taken conveniently from the scow, or the power can be provided by an auxiliary engine located on land convenient to the supplemental conveyer, and from this engine a driving-belt is carried to one of the large sheaves of the auxiliary conveyer. A framework at each end and at one or more intermediate points in its length support the auxiliary conveyer at proper height from the level of the ground, and each being mounted on a wheeled truck 57 the apparatus can readily be moved and its position changed as the point of deposit for the material requires to be shifted—as, for instance, in grading operations. The ends of the frame-sections 47 of the conveyer are connected together on the truck-frame by a hinge-joint 58, located at the axis of the driving-sheave 53, and moving up and down on this joint the outer or opposite end of the frame will accommodate itself to differences in the level of the trucks and also allow the forward end of the conveyer nearest the scow to rise and fall with the movements of the scow when that end of the conveyer-frame is supported on a floating platform or a scow, as shown at 59, Fig. 7. With this auxiliary conveyer the dredged material can be transferred directly from the end of the main conveyer on the dredging-scow to a point or locality at a considerable distance from the place of dredging without the necessity of handling it a second time. The conveyers are susceptible of being extended indefinitely for this purpose by working them in sections each having the necessary driving power supplied from an engine convenient to it. The advantage of handling the material directly from the dredging-wheel in this manner reduces the cost of the work.

Having thus fully described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. In a dredging and excavating machine, the combination with a movable platform, a dredging-wheel mounted thereon for rotation in an upright plane, of means for raising and lowering the platform, comprising fixed nuts in the platform on opposite sides of the axle, screw-rods working through the nuts, fixed bearings below the movable platform in which the lower ends of the screw-rods are fitted to rotate, power-driven shafts mounted on the platform and gears connecting the screw-rods with said shafts to rotate the rods in unison, and an adjustable counterbalance on the movable platform.

2. In a dredging-machine the combination with a vertically-movable platform, a dredging-wheel mounted thereon for rotation in an upright plane, of a pair of driving-engines mounted on said platform on opposite sides of the axis of the wheel, means separately connecting the engines with the dredging-wheel to rotate the latter, means for raising and lowering the movable platform comprising fixed nuts in the platform on opposite

sides of the wheel-axis, screw-rods having bearings at the lower ends in stationary supports below the platform, gears connecting said screw-rods together to rotate in unison, a counter-shaft to each engine geared thereto, gears connecting each screw-rod to the counter-shaft on the same side, means connecting the same counter-shafts with the dredging-wheel to rotate the latter, clutches on each counter-shaft adapted to connect the power at will with either the platform-elevating screws or with the wheel-driving means, and a counterbalance on the movable platform on the side of the elevating-screws opposite to the dredging-wheel and means for shifting said counterbalance longitudinally of the platform.

3. In a dredging and excavating machine, the combination of a movable platform, a dredging-wheel mounted thereon for rotation in an upright plane, means also carried by the same platform for rotating the dredging-wheel comprising a ring-gear on the back face of the dredging-wheel, an engine-driven shaft and gears meshing with the ring-gear, connecting the engine-driven shaft therewith and an endless-apron conveyer supported transversely of the movable platform above the axle of the wheel, and means for imparting traveling movement to the apron in time with the rotations of the wheel comprising a sheave on the axle of the dredging-wheel driven thereby, sheaves carrying the outer ends of the conveyer-apron and belts connecting said sheaves.

4. In a dredging and excavating machine, the combination with a dredging-wheel mounted for rotation in an upright plane, said wheel having receptacles concentric with the axis of rotation, each receptacle being provided with inclined bottoms and having inlet-apertures on one side and an outlet-aperture in the opposite side of the dredger-wheel, of the hinged door to the outlet of each receptacle adapted to open under the weight of the material within the receptacle, a draw-rod movable in guides on the back of the wheel in a plane parallel with the door, a roller on the end of said rod bearing against the door when the rod is in its lowest position, and means on stationary supports behind the wheel operating in the rotation of the wheel to draw up the said rods and release the door.

5. In a dredging and excavating machine, a dredging-wheel mounted for rotation in an upright plane, and having a central air and water tight compartment, a plurality of receptacles between said central compartment and the rim of the wheel, each of said compartments having inlets for the dredged material in the front face provided with scoop-shaped cutters, a rearwardly-inclined bottom, an outlet at the lowest part of said incline in the back face of the wheel, an outwardly-swinging door to said outlet, and means for holding said door closed, and releasing the same at regular intervals in the rotation of the wheel, comprising a draw-rod carried on the back face of the wheel movable in guides parallel with the outer face of the door, a roller on the lower end of the draw-rod adapted to engage the door, and fixed inclines situated in relation to the outer or opposite end of the draw-rod and operating to engage the end of the rod and move the same at intervals by the rotation of the dredging-wheel.

6. In a dredging and excavating machine, the combination with the dredging-wheels mounted for rotation in an upright plane and having concentrically-arranged receptacles for the dredged material, said receptacles having inlet-apertures provided with scoop-shaped cutters, of the nozzle having apertures adapted to deliver jets of water into the scoops and a pipe adapted to connect said nozzle with a head of water.

7. In a dredging and excavating machine, the combination of a dredging-wheel mounted for rotation in an upright plane and provided with receptacles for the dredged material having outlets in the rear face of the wheel, means for imparting rotary motion thereto, an endless conveying-apron mounted to travel in a plane transversely of the wheel across the rear face thereof below the said outlets, and the auxiliary conveyer comprising an endless traveling conveying-apron, the movable truck-frames in which the latter are supported, said aprons having hinge-joints connecting one section with another on the same frame, and means for imparting traveling motion to the aprons.

In testimony whereof I have signed my name in the presence of two subscribing witnesses.

JOHN J. CONLIN.

Witnesses:
EDWARD E. OSBORN,
M. REGNER.